CHAPTER 4
GUTTERS

4-1. General.

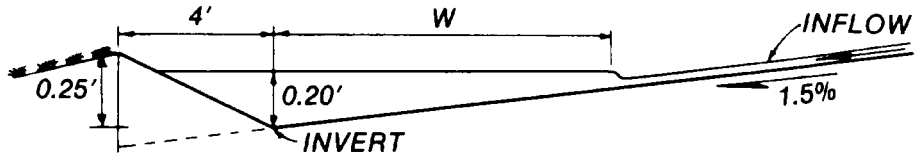
Shallow, structurally adequate paved gutters adjacent to airfield pavements are frequently required to provide positive removal of runoff from paved areas, to protect easily eroded soils adjacent to the pavement, and to prevent the softening of turf-shoulder areas caused by the large volume of runoff from adjoining pavements.

4-2. Discharge capacity.

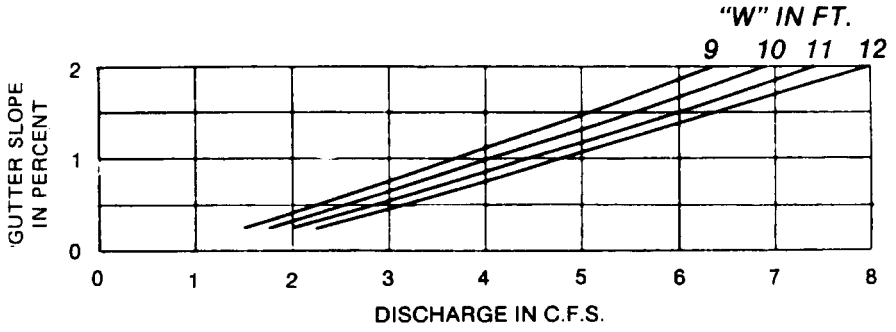
The discharge capacity of gutters depends on their shape, slope, and roughness. Manning's equation may be used for calculating the flow in gutters; however, the roughness coefficient n must be modified somewhat to account for the effect of lateral inflow from the runway. The net result is that the roughness coefficient for the gutter is slightly higher than that for a normal surface of the same type. The assumption of uniform flow in gutters is not strictly correct since runoff enters the gutter more or less uniformly along its length. The depth of flow and the velocity head increase downslope in the gutter, and the slope of the energy gradient is therefore flatter than the slope of the gutter. The error increases rapidly as the gutter slope is flattened, and on very flat slopes the gutter capacity is much less than that computed using the gutter slope in Manning's equation.

4-3. Design charts.

A cross section of a typical runway gutter and the design charts are shown in figure 4-1. Safety and operational requirements for fast-landing speeds make it desirable to provide a continuous longitudinal grade in the gutter conforming closely to the runway gradient thereby minimizing the use of sumped inlets. A sufficient number of inlets will be provided in the gutter to prevent the depth of flow from exceeding about 21/2 inches.



TYPICAL GUTTER SECTION
FOR MILITARY AIRFIELDS



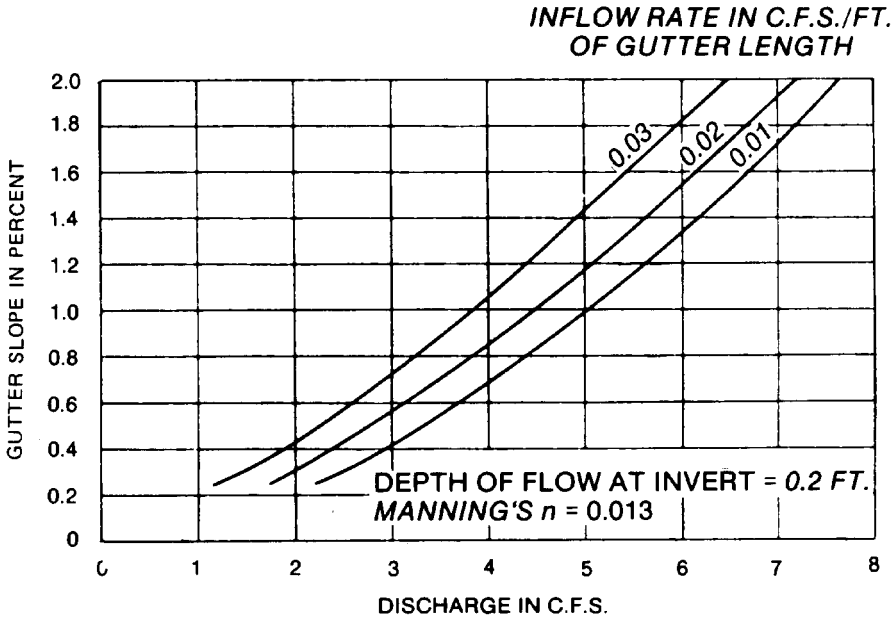


Figure 4-1. Drainage gutters for runways and aprons.